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QUARLES & BRADY LLP
411 E. WISCONSIN AVENUE
SUITE 2040
MILWAUKEE, WI 53202-4497

EXAMINER
HANNAHER, CONSTANTINE

ART UNIT	PAPER NUMBER
2878	

DATE MAILED: 09/05/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

RF

Office Action Summary	Application No.	Applicant(s)	
	09/683,935	RUZGA, RICHARD J.	
	Examiner	Art Unit	
	Constantine Hannaher	2878	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-19 and 22-27* is/are rejected.

7)☒ Claim(s) *20 and 21* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *3* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement May 24, 2003 is entirely duplicative of the statement submitted April 29, 2002 and only one statement is returned.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 6-16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 6 recites the limitation "the two-dimensional array" in line 7. There is insufficient antecedent basis for this limitation in the claim. The microphotonic switching devices are established in line 4 as only a "first" array. The balance of the claims is rejected on the basis of their dependence.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1, 2, 5, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Petroff (US005391878A) in view of the Japanese patent document to Sumitomo (JP2001337083A).

With respect to independent claim 1, Petroff discloses a radiation detector (Fig. **1A**) for an imaging apparatus comprising a scintillator **10** and an optical routing matrix adjacent to the scintillator (multiplexed array of fluorescent fibers). The optical routing matrix in the radiation detector of Petroff comprises a plurality of input paths (fiber intersections) and a reduced number of output paths but no optical switches. Sumitomo discloses a radiation detector (Fig. **5**) comprising a scintillator (paragraph 0019) and an optical routing matrix adjacent to the scintillator to receive light along a plurality of input paths **33** and having an output light path **33′** and an optical switch **36**. In view of the improved multiplexing through the use of a single detector **39** in Sumitomo, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the radiation detector of Petroff to substitute the fibers **33** of Sumitomo for the fibers **12**, **14** of Petroff such that optical switch **36** as suggested by Sumitomo delivered light according to the change mechanism to suitable timing (paragraph 0019) to a single detector rather than multiple detectors **20** while retaining complete information as to the portion of the scintillator generating light in response to radiation. Although optical switch **36** of Sumitomo is described in the singular, in view of the arbitrary numbers of fibers **33** which may be attached, it would have been obvious to one of ordinary skill in the art at the time the invention was made that the operation of switch **36** required a plurality of optical switches. Electrical operation (as compared to, for example, hydraulic or pneumatic operation) would be routine.

With respect to dependent claim 2, the optical fiber **33′** suggested by Sumitomo constitutes an optical conduit.

With respect to dependent claim 5, the scintillator crystals **11** in the radiation detector of Petroff are considered suitable for converting x rays to light.

With respect to independent claim 17, Petroff discloses a radiation detector (Fig. **1A**) for an imaging apparatus comprising a scintillator **10**, an optical conduit **18**, and an optical routing matrix adjacent to the scintillator (multiplexed array of fluorescent fibers). The optical routing matrix in the radiation detector of Petroff defines a plurality of detection sites in the scintillator **10** (fiber intersections) and a reduced number of output conduits **18** but no optical switches. Sumitomo discloses a radiation detector (Fig. **5**) comprising a scintillator (paragraph 0019), an output conduit **33′**, and an optical routing matrix adjacent to the scintillator to receive light from a plurality of detection sites and an optical switch **36**. In view of the improved multiplexing through the use of a single detector **39** in Sumitomo, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the radiation detector of Petroff to substitute the fibers **33** of Sumitomo for the fibers **12, 14** of Petroff such that optical switch **36** as suggested by Sumitomo delivered light according to the change mechanism to suitable timing (paragraph 0019) to a single detector rather than multiple detectors **20** while retaining complete information as to the portion of the scintillator generating light in response to radiation. Although optical switch **36** of Sumitomo is described in the singular, in view of the arbitrary numbers of fibers **33** which may be attached, it would have been obvious to one of ordinary skill in the art at the time the invention was made that the operation of switch **36** required a plurality of optical switches. Electrical operation (as compared to, for example, hydraulic or pneumatic operation) would be routine.

6. Claims 3, 4, 18, 19, and 22-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Petroff (US005391878A) and Sumitomo (JP2001337083A) as applied to claims 1 and 17 above, and further in view of Judy *et al.* (US005945898A).

With respect to dependent claim 3, Sumitomo does not identify the structure of optical switch **36**. An optical routing matrix suitable for an energy sensor comprising independently

movable microelectromechanical mirrors is known from Judy *et al.* In view of the one-dimensional array of optical switch **36** in Sumitomo and the two-dimensional array of fiber **33** ends confronting the scintillator (paragraph 0019) the provision of a two-dimensional array of mirrors as suggested by Judy *et al.* for the optical paths represented by fibers **33** in Sumitomo and the provision of a one-dimensional array of mirrors as suggested by Judy *et al.* for the optical switch **36** would have been obvious to one of ordinary skill in the art at the time the invention was made in view of the batch process microfabrication replacing mechanical assembly of fibers.

With respect to dependent claim 4, Sumitomo does not identify the structure of optical switch **36**. An optical switch suitable for an energy sensor comprising microelectromechanical mirrors is known from Judy *et al.* In view of the one-dimensional array of optical switch **36** in Sumitomo, the provision of a one-dimensional array of mirrors as suggested by Judy *et al.* for the optical switch **36** would have been obvious to one of ordinary skill in the art at the time the invention was made in view of the batch process microfabrication replacing mechanical assembly of fibers.

With respect to dependent claims 18 and 19, an optical routing matrix suitable for an energy sensor comprising independently movable microelectromechanical mirrors is known from Judy *et al.* In view of the two-dimensional array of fiber **33** ends confronting the scintillator (paragraph 0019) in Judy *et al.*, the provision of a two-dimensional array of mirrors as suggested by Judy *et al.* for the optical paths represented by fibers **33** in Sumitomo would have been obvious to one of ordinary skill in the art at the time the invention was made in view of the batch process microfabrication replacing mechanical assembly of fibers. The devices suggested by Judy *et al.* constitute either recitation in view of the torsion beams and mirrors.

With respect to dependent claim 22, the first array suggested by Judy *et al.* is of the recited type (see, for example, the rows in Fig. **4**).

With respect to dependent claim 23, in view of the one-dimensional array of optical switch **36** in Sumitomo the provision of a one-dimensional array of mirrors as suggested by Judy *et al.* for the optical switch **36** would have been obvious to one of ordinary skill in the art at the time the invention was made in view of the batch process microfabrication replacing mechanical assembly of fibers.

With respect to dependent claim 24, Sumitomo does not identify the structure of optical switch **36**. An optical routing matrix suitable for an energy sensor comprising independently movable microelectromechanical mirrors is known from Judy *et al.* In view of the one-dimensional array of optical switch **36** in Sumitomo and the two-dimensional array of fiber **33** ends confronting the scintillator (paragraph 0019) the provision of a two-dimensional array of mirrors as suggested by Judy *et al.* for the optical paths represented by fibers **33** in Sumitomo and the provision of a one-dimensional array of mirrors as suggested by Judy *et al.* for the optical switch **36** would have been obvious to one of ordinary skill in the art at the time the invention was made in view of the batch process microfabrication replacing mechanical assembly of fibers.

With respect to dependent claim 25, the first array of microphotonic switching devices suggested by Judy *et al.* has the recited structure in view of silicon wafer **401**, electrically steerable mirror **102**, springs **104**, **106**, and actuator electrodes **110**, **112**.

With respect to dependent claim 26, in view of the controlled deflection described by Judy *et al.* (column 5, line 43), it would have been obvious to one of ordinary skill in the art at the time the invention was made to include a sensor of the deflection in view of the desire for confirmation of proper operation.

With respect to dependent claim 27, the scintillator crystals **11** in the radiation detector of Petroff are considered suitable for converting x rays to light.

7. Claims 6-10 and 13-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Petroff (US005391878A) in view of Sumitomo (JP2001337083A) and Judy *et al.* (US005945898A).

With respect to independent claim 6, Petroff discloses a radiation detector (Fig. **1A**) for an imaging apparatus comprising a scintillator **10** and a first array adjacent to the scintillator (multiplexed array of fluorescent fibers) each intersection receiving light from a different section **11** of the scintillator. The first array in the radiation detector of Petroff comprises a two-dimensional array (fiber intersections) and a reduced number of optical conduits **18**. Sumitomo discloses a radiation detector (Fig. **5**) comprising a scintillator (paragraph 0019) and a first array of fiber **33** ends and having an optical conduit **33'** coupled to the two-dimensional array and an optical switch **36**. In view of the improved multiplexing through the use of a single detector **39** in Sumitomo, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the radiation detector of Petroff to substitute the first array of Sumitomo for the fibers **12, 14** of Petroff such that optical switch **36** as suggested by Sumitomo delivered light according to the change mechanism to suitable timing (paragraph 0019) to a single detector through the optical conduit rather than multiple detectors **20** while retaining complete information as to the portion of the scintillator generating light in response to radiation. An first array of microphotonic switching devices suitable for an energy sensor comprising independently movable microelectromechanical mirrors is known from Judy *et al.* In view of the two-dimensional array of fiber **33** ends confronting the scintillator (paragraph 0019) the provision of a two-dimensional array of mirrors as suggested by Judy *et al.* for the optical paths represented by fibers **33** in Sumitomo would have been obvious to

one of ordinary skill in the art at the time the invention was made in view of the batch process microfabrication replacing mechanical assembly of fibers.

With respect to dependent claims 7 and 8, the devices suggested by Judy *et al.* constitute either recitation in view of the torsion beams and mirrors.

With respect to dependent claim 9, the first array of microphotonic switching devices suggested by Judy *et al.* has the recited structure in view of silicon wafer **401**, electrically steerable mirror **102**, springs **104**, **106**, and actuator electrodes **110**, **112**.

With respect to dependent claim 10, in view of the controlled deflection described by Judy *et al.* (column 5, line 43), it would have been obvious to one of ordinary skill in the art at the time the invention was made to include a sensor of the deflection in view of the desire for confirmation of proper operation.

With respect to dependent claim 13, the first array suggested by Judy *et al.* is of the recited type (see, for example, the rows in Fig. **4**).

With respect to dependent claim 14, in view of the one-dimensional array of optical switch **36** in Sumitomo the provision of a one-dimensional array of mirrors as suggested by Judy *et al.* for the optical switch **36** would have been obvious to one of ordinary skill in the art at the time the invention was made in view of the batch process microfabrication replacing mechanical assembly of fibers.

With respect to dependent claim 15, Petroff shows (column 1, line 40) that a solid state device to convert light into an electrical signal is known.

With respect to dependent claim 16, the scintillator crystals **11** in the radiation detector of Petroff are considered suitable for converting x rays to light.

Allowable Subject Matter

8. Claims 20 and 21 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

9. Claims 11 and 12 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

10. The following is a statement of reasons for the indication of allowable subject matter: The magnetic microactuator of Judy *et al.* does not suggested a gating element.

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Constantine Hannaher whose telephone number is (703) 308-4850. The examiner can normally be reached on Monday-Friday with flexible hours.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David P. Porta can be reached on (703) 308-4852. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

ch

/Lee Nguyen/
Primary Examiner
Art Unit 2878